

Claims

- [c1] A method for protecting non-targeted tissue during photodynamic therapy induced using a photosensitizing agent or a pre-photosensitizing agent, the method comprising the steps of:
- administering an agent to a targeted treatment site, the agent being effective to accumulate in tissue at the targeted treatment site as a photosensitizing agent; and irradiating the targeted treatment site to activate the photosensitizing agent to cause phototoxicity in tissue at the targeted treatment site while inhibiting phototoxicity of the photosensitizing agent in non-targeted tissue surrounding the targeted treatment site such that the non-targeted tissue is substantially unaffected.
- [c2] The method of claim 1, wherein the step of inhibiting phototoxicity of the photosensitizing agent in non-targeted tissue comprises reducing the oxygen-content in the non-targeted tissue during the step of irradiating the treatment site.
- [c3] The method of claim 2, wherein the step of reducing the oxygen-content in the non-targeted tissue comprises applying an external vacuum to the non-targeted tissue.

- [c4] The method of claim 2, wherein the step of reducing the oxygen-content in the non-targeted tissue comprises the step of flushing the non-targeted tissue with nitrogen gas.
- [c5] The method of claim 4, wherein the non-targeted tissue is flushed with nitrogen gas by positioning a housing having a chamber formed therein on the non-targeted tissue such that the non-targeted tissue is in communication with the chamber, and filling the chamber with nitrogen gas.
- [c6] The method of claim 2, wherein the step of reducing the oxygen-content in the non-targeted tissue comprises the step of decreasing local circulation and delivery of oxygenated blood to the non-targeted tissue.
- [c7] The method of claim 6, wherein local circulation and delivery of oxygenated blood is decreased by positioning a housing having a chamber formed therein on the non-targeted tissue such that the tissue is in communication with the chamber, and creating a vacuum within the chamber.
- [c8] The method of claim 7, wherein the housing includes a porous, tissue-contacting surface such that the tissue deforms around the tissue-contacting surface when a

vacuum is created within the chamber.

- [c9] The method of claim 1, wherein the non-targeted tissue comprises epithelial tissue.
- [c10] The method of claim 1, wherein the non-targeted tissue comprises epidermal tissue.
- [c11] The method of claim 1, wherein the agent comprises a photosensitizing agent.
- [c12] The method of claim 1, wherein the agent comprises a pre-photosensitizing agent.
- [c13] The method of claim 12, where the pre-photosensitizing agent is selected from the group consisting of aminolevulinic acid and esters of aminolevulinic acid.
- [c14] The method of claim 1, wherein the agent is selected from the group consisting of porphyrins, chlorines, porphycenes, purpurins, phthalocyanines, naphthalocyanines, bacteriochlorins, benzophenothiazines, and combinations thereof.
- [c15] A device for protecting non-targeted tissue during photodynamic therapy induced using a photosensitizing agent or a pre-photosensitizing agent, comprising:
a tissue-contacting member adapted to decrease local circulation and delivery of oxygenated blood to non-

targeted tissue, at least a portion of the tissue-contacting member being transparent to allow light from an irradiating light source to pass therethrough during photodynamic therapy.

[c16] The device of claim 15, wherein the tissue-contacting member comprises a housing having a chamber formed therein and adapted to be positioned in communication with non-targeted tissue.

[c17] The device of claim 16, further comprising a vacuum coupled to the chamber for creating a vacuum force within the chamber to reduce blood flow to the non-targeted tissue.

[c18] The device of claim 17, wherein the tissue-contacting member is further adapted to deform the non-targeted tissue to inhibit blood flow to the tissue.

[c19] The device of claim 18, further comprising a porous material formed on a tissue-contacting portion of the housing such that, when a vacuum force is creating within the chamber, the non-targeted tissue deforms around the porous material.

[c20] The device of claim 19, wherein the porous material comprises a wire mesh material.

[c21] The device of claim 16, further comprising a nitrogen source coupled to the chamber for flushing the non-targeted tissue with nitrogen.

[c22] The device of claim 15, further comprising a light source coupled to the tissue-contacting member for delivering irradiating light to the non-targeted tissue.